Other LLLT Application

Application on bedsores

Medical breakthrough in Laser Medicine, King Faisal Hospital, Saudi Arabia

Validation of observations made at King Faisal Hospital on bedsores treated by LLLT laser:

Click here for the video

Day 1:
Sep. 12th, 2008: heel 3.6/7 cm; ankle 2 cm

Day 3:
Sep. 15th, 2008: heel 3.3 x 1.5 cm; ankle 1.5 x 1 cm
Day 5:
Sep. 17th, 2008: heel 3 x 1,7 cm; ankle 1,5 x 0,9 cm
Day 6:
Sep. 18th, 2008: heel 2,9 x 1 cm; ankle 1,5 x 0,7 cm
Abstract:

**Objective:** The aim of this investigation was to compare, by light microscopy, the effects of the use of laser photobiomodulation (LPBM) and polarized light (PL) on second-degree burns on rodents.

**Background Data:** Burns are severe injuries that result in the loss of tissue fluids, destruction of tissues, infection, and shock. With severe and widespread third-degree burns death may occur. Several light sources have been suggested as being effective for improving wound healing.

**Materials and Methods:** Forty five rats were used in this study. A second-degree burn was created on the dorsum of each animal, and the animals were divided into four groups: PL (400-2000 nm, 40 mW, 2.4 J/cm²/min); LPBM-1 (780 nm, 35/40 mW, θ ~ 2 mm, 4 x 5 J/cm²); LPBM-2 (660 nm, 35/40 mW, θ ~ 2 mm, 4 x 5 J/cm²); and untreated animals acted as controls. The treatment was started immediately post-burn at four points around the burned area (laser: 5 J/cm² per site). The illumination with PL was performed according to the manufacturer's instructions. Treatments were repeated at 24-h intervals for 7 d. The animals were sacrifice at 3, 5, and 7 d post-burn. The specimens were routinely cut and stained and analyzed by light microscopy using...
hematoxylin and eosin and Sirius red.

**Results:** The analysis of the results demonstrated that the damaged tissue was able to efficiently absorb and process the light at all tested wavelengths. LPBM at 660 nm showed better results at early stages of wound healing. However, the use of 780-nm laser light had beneficial effects throughout the experimental period, with the animals growing newly-formed tissue similar to normal dermis.

**Conclusion:** Despite our findings that the use of both types of light energy improved the healing of second-degree burns at the early stages, long-term assessment is needed to verify if this improvement will influence the final results of treatment.

p. 297:
"It should be noted that light penetration into skin results in a reduction of the amount of energy that reaches the subcutaneous tissue. Most studies of wound healing showed better results when shorter wavelengths were used. However, we have found good results with the use of an IR laser, alone or in association with a shorter wavelength (44). This aspect was further confirmed in the present investigation, and it may be a result of the deeper penetration of IR laser energy, which resulted in the stimulation of the cells located in the deeper portions of the wounds, as well as the effect of heating, which is usually seen when high fluencies are used at the wavelength. The combination of wavelengths with different levels of absorption and penetration may further improve wound healing, as LPBM may stimulate repair at both at the surface and at deeper levels. It is also important to note that the choice of optical parameters used for improved wound healing depend on wavelength, dose per session, the model used, the type of wound, and the treatment conditions, among other factors."

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